Section: **2.5**
Quality Reviews

Description: This section describes the quality review and assurance mechanisms that are used with the software engineering methodology. The purpose of the quality reviews is to assure that the established system development and project management processes and procedures are being followed effectively, and that exposures and risks to the current project plan are identified and addressed. The quality reviews facilitate the early detection of problems that could affect the reliability, maintainability, availability, integrity, safety, security, or usability of the software product. The quality reviews enhance the quality of the end work products and deliverables of a project.

The quality reviews are conducted as Peer Reviews, Structured Walkthroughs, In-Stage Assessments (ISA) and Stage Exits. The quality review used depends on the work product being reviewed, the point of time within the stage, and the role of the person conducting the review.

Review Processes: **Peer Review**
A peer review is an informal review of software or systems engineering work products including documentation that can be conducted at any time at the discretion of the work product developer. These informal reviews are performed by the developer's "peers"-- frequently other developers working on the same project. Informal reviews can be held with relatively little preparation and follow up activity. Review comments are informally collected and the product developer determines which comments require future action. Peer reviews focus on the specific content of a product and are geared to help the developer improve the product.

Some of the work products prepared are considered interim work products as they feed into a major deliverable or into another stage. The interim work products are ideal candidates for the peer review; however, all work products can be candidates for peer reviews. Frequent peer review should be conducted multiple times on a work product to ensure that it is free of defects.

Structured Walkthrough
The structured walkthrough is an organized procedure for reviewing and discussing the technical aspects of software or systems engineering work products including documentation. Structured walkthroughs are used to find errors early in the development process and to improve the quality of the product. They are very successful in identifying design flaws, errors in analysis or requirements definition, and validating the accuracy and completeness of deliverable work products.

Review Process, continued:

Structured walkthroughs are conducted during all stages of the project lifecycle. They are used during the development of work products identified as deliverables for each stage (see Exhibit 2.0-1), such as requirements, specifications, design, code, test data, and documentation. Structured walkthroughs are used after the work products have been completed to verify the correctness and the quality of the finished product. They should be scheduled in the work breakdown structure developed for the project plan and can be referred to as code reviews, design reviews, or inspections. Structured walkthroughs should also be scheduled to review small, meaningful pieces of work. The progress made in each lifecycle stage should determine the frequency of the walkthroughs; however, they may be conducted multiple times on a work product to ensure that it is free of defects.

Structured walkthroughs can be conducted at various times in the development process, in various formats, with various levels of formality, and with different types of participants. They typically require some advance planning activities, a formal procedure for collecting comments, specific roles and responsibilities for participants, and have prescribed follow-up action and reporting procedures. Frequently reviewers include people outside of the developer's immediate peer group. The structured walkthrough is described in detail in Appendix C, *Conducting Structured Walkthroughs*.

In-Stage Assessment

The in-stage assessment (ISA) is a quality review that is conducted by a reviewer who is typically independent of the project. The reviewer assesses software or systems engineering project's processes, work products, and deliverables to verify adherence to standards and that sound system development and project management practices are being followed. This is particularly important when multiple deliverables are developed in a single lifecycle stage. The reviewer assesses the deliverable and prepares an ISA report based on the information contained within the deliverable. An ISA does not require meetings among the involved parties to discuss the deliverable; however a meeting is often scheduled with the reviewer and the work product developer once the ISA report is completed in order to review the findings. Subject matter experts, such as documentation editors, may be used in addition to the assessor to further improve the quality of work products.

An ISA can be conducted anytime during a stage whenever a deliverable is stable enough, or near the end of a stage to prepare for stage exit. An ISA can be conducted for each of the work products or one ISA for multiple work products depending on when the work products are made available for review and the size of the work products. ISAs are conducted in all stages of the project lifecycle and should be scheduled in the work breakdown structure developed for the project

Review Process, continued:

plan. The ISA is described in detail in Appendix D, *In-Stage Assessment Process Guide*.

Stage Exit

The stage exit is a process for ensuring a project meets the DOE and project standards identified in the project plan. The stage exit is conducted by the project manager with the project stakeholders, e.g., system owner, user point of contact, quality assurance point of contact, security point of contact, architecture and standards point of contact, project manager's manager, and platform point of contact. It is a high-level evaluation of all work products developed in a lifecycle stage. It is assumed that each deliverable has undergone several peer reviews and/or structured walkthroughs as appropriate and a successful ISA was conducted prior to the stage exit process. The stage exit focuses on the satisfaction of all requirements for the stage of the lifecycle, rather than the specific content of each deliverable.

The goal of a stage exit is to secure the concurrence (i.e., approval) of designated key individuals to continue with the project and to move forward into the next lifecycle stage. The concurrence is an approval (sign-off) of the deliverables for the current stage of development including the updated project plan. It indicates that all qualifications (issues and concerns) have been closed or have an acceptable plan for resolution. At a stage exit meeting, the project manager communicates the positions of the key personnel, along with qualifications raised during the stage exit process, issues that remain open from the ISA, and the action plan for resolution to the project team, stakeholders, and other interested meeting participants. The stage exit meeting is documented in summary form. Only one stage exit for each stage should be necessary to obtain approval assuming all deliverables have been accepted as identified in the project plan. The stage exit is described in detail in Appendix E, *Stage Exit Process Guide*.

References:

Appendix C, *Conducting Structured Walkthroughs*, provides a procedure and sample forms that can be used for structured walkthroughs.

Appendix D, *In-Stage Assessment Process Guide*, provides a procedure and sample report form that can be used for in-stage assessments.

Appendix E, *Stage Exit Process Guide*, provides a procedure and sample report form that can be used for stage exits.

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